

THE

Photographic Tourist,

GIVING FULL DIRECTIONS

FOR

LANDSCAPE PHOTOGRAPHY,

AND CONTAINING A DESCRIPTION OF THE MANIPULATION

AND APPARATUS REQUIRED FOR THE

ALBUMENIZED, COLLODION, OXYMEL,

AND WAXED PAPER PROCESSES,

ALSO DIRECTIONS FOR

PRINTING POSITIVE COPIES ON PAPER OR ON GLASS,

EITHER AS

TRANSPARENT STEREOSCOPIC VIEWS,

OR FOR USE AS

MAGIC LANTERN SLIDERS.

THIRD EDITION.

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Introduction.

THE many various processes that have been recommended as preservative, or dry collodion, have been merely the different hobbies of practical photographers, but, except in the hands of a skilful adept, not successful with the general amateur, who has but little time to overcome the difficulties that surround him. In the manipulation described in the following pages, the writer does not claim the merit of originality, except in a few details; but he has so worked them practically that they may be depended on, as containing sufficient authority for the most inexperienced, to produce, in the space of a few days' practice, pictures that will bear comparison with many that have been taken by other processes after months of study. The Dry Collodion process here described, is in substance the same as published by him two years since, but the most difficult and intricate portions of that process have either been modified or omitted, so that the amateur will, it is hoped, readily understand, and successfully carry out the remaining portions.

In giving directions for Stereoscopic pictures, the union of simplicity and perspecuity has been attempted, it is hoped with success: in fact, it will be found that the production of these charming double-pictures involve no more mechanical difficulties than are met with in

ordinary landscape views, while the portability of the apparatus renders it within the means of those to whom a heavy load would be a serious inconvenience, if not an entire prohibition.

In enumerating the different apparatus required, it is to be understood that some few of the articles described may be omitted from the absolute necessities, but they all will be found positively useful, and that in so many ways as to render it advisable to have them in readiness. To those who may be disposed to turn their attention to this subject, and have any doubt as to their being able to succeed, practical instruction may be had at my establishment, where I have erected a glass room, and can guarantee to perfect, in two lessons, any person who has a slight knowledge of photography, and which, with a few days practice, will be found sufficient.

For those who object to the trouble of preparing the glass plates themselves, we can supply them, either ready sensitive for the camera, or merely albumenized only. All the solutions required are also kept in stock fit for immediate use.

I have also re-written the directions for printing paper pictures, and added a chapter on the waxed paper process, which is more convenient for tourists who have long journeys, or are likely to be absent from home for a very considerable time, as the paper can be readily sensitized under almost any circumstances.

Apparatus.

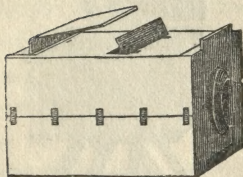


Fig. 1.

For ordinary landscapes the folding camera, *fig. 1*, is recommended; it possesses the advantage of extreme portability and durability. The sides of the camera are jointed, to enable it to fold flat, and pack inside a portmanteau; the dark slides for the collodion plate and the focussing screen together only forming a package three inches thick. Where it is required to use a double combination lens for taking portraits as well as landscapes, a camera with a sliding and folding body is recommended: these are quite as portable as the plain folding cameras, and possess the advantage of suiting lenses of different focal lengths.

For the production of stereoscopic pictures, the Tourist's camera, *fig. 2*, will be found far the most convenient, the camera, lens, six or nine dark slides as required, the top of the stand, and focussing screen, packing into a box 11-in. by 9-in., and 7-in. thick, the whole of which will weigh under 8 pounds.

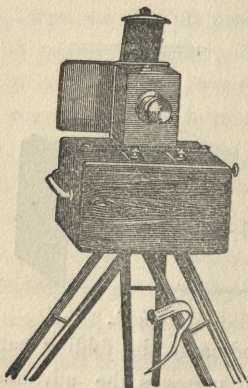


Fig. 2.

When required for use, the camera is taken out of the case and slipped on a dove-tail groove outside the box, which thus forms the table; on the top of this box, but underneath the camera, are two parallel laths, which turn on a pivot at one end, the other end is fastened to the bottom of the camera: by this means the camera may be moved from side to side without altering the position of the image on the ground glass of the camera. The prepared plates are inserted into the dark slides

previous to leaving home, and thus each is used as required.

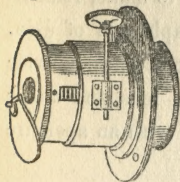


Fig. 3.

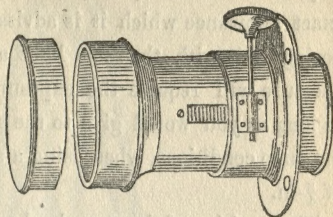


Fig. 4.

For LANDSCAPES, the lens recommended is the *single achromatic*, *fig. 3*, mounted either with rack and pinion adjustments, or with sliding tubes. In using lenses of this description it will be requisite to employ a stop or diaphragm, to curtail the amount of light. As many operators are not aware on what principle to regulate the different size stops, it will be advisable to remember that the smaller the aperture the longer will be the exposure in the camera of the sensitive plate, but at the same time the picture will be improved in definition, and objects at different distances from the camera will be more in focus. For example, fit your camera on the stand, and insert a diaphragm of $\frac{3}{4}$ -in. diameter, and focus for an object, say ten yards off, at the same time observing the appearance of another object at twenty yards distance; then alter the diaphragm to one of $\frac{1}{2}$ -in. aperture, when both the objects will be sharper and better defined than either of them were before; but in a dull light, or in photographing a subject with dark shadows, the larger size stops must be em-

ployed. In this respect practice will alone teach the exact allowance which it is advisable to make, remembering that with the same light a diaphragm of $\frac{1}{2}$ -in. aperture will require the exposure to be nearly twice as long as you would give to the same lens, and under the same conditions, when using a stop with an aperture of $\frac{3}{4}$ -in.

The position of the stop also has a great influence on the sharpness of the picture; as a general rule, the stop should be placed as far in advance of the lens as the diameter of the glass. But should the objects in the centre of the view be further from the camera than those at the side, a different distance between the stop and the lens will give a more perfect image than if the side objects were the farthest from the camera; therefore it is advisable to have the diaphragms made so as to slide up and down the tube. By this means any allowance may be made, at the judgment of the operator.

For PORTRAITS, or objects that are likely to move their position, the double combination achromatic lenses *fig. 4*, are indispensable; they consist of a set of four glasses, adapted to each other, and produce pictures in less than half the time required for the single achromatic. In taking groups of men or animals in the shade, no stop will be required, but if there is a strong glare, or the objects are in the direct sunshine, a slight curtailment will be advisable. Most lenses of this description can be made to adapt for landscapes or views, at a slight additional cost.

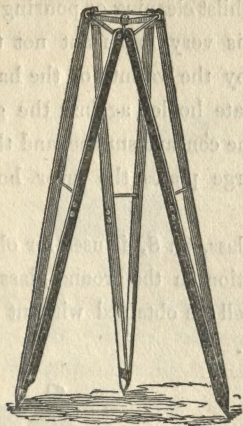


Fig. 5.

For supporting the camera, a stand will be required; the most convenient to the tourist will be one as described in *fig. 5*. The legs unslip from the top, and strap together. For travelling they can be had jointed; which will improve their portability, but necessarily weaken them in a slight degree.

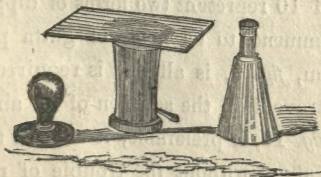


Fig. 6.

Fig. 7.

Fig. 8.

Fig. 6 represents a simple form of plate holder, to

hold the plate whilst cleaning or pouring on the albumen coating, (as it is very important not to let the glass become heated by the warmth of the hand;) by gently pressing the plate holder against the glass, the air is expelled from the concave surface, and the plate adheres firmly. For large plates the lever holder, *fig. 7*, is recommended.

A focussing glass, *fig. 8*, is used for obtaining a clear and sharp definition on the ground glass of the camera, which cannot well be obtained without the use of this little instrument.

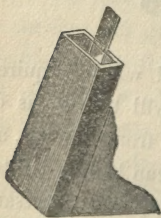


Fig. 9.

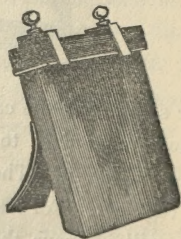


Fig. 10.

Figs 9 and 10 represent two forms of dipping baths, these I recommend to be made of gutta percha; the ordinary form, *fig. 9*, is all that is required for home use, but for travelling, the addition of an air-tight top, as shown in *fig. 10*, is preferable, it enables the solution to be carried about without the trouble of returning it to the bottle; in all cases, however, the silver must occasionally be filtered. There is a dipper supplied to

lay the plate on previous to immersion, and which also forms the means for withdrawing it again when required.

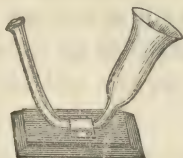


Fig. 11.

Albumen filter,—this most important instrument was recommended by Mr. Crooks, and will be found the means of simplifying the filtering of the albumen. The white of egg, after having been iodized and filtered through a common funnel, will be ready for use. To use it—first take a small piece of sponge and well wash the same, then place it in the bottom part of the large end of the filter, press it lightly down, and pour the albumen on the top of the sponge so as to nearly fill the glass; in a few minutes it will percolate through the sponge and rise in the small tube, from which it is to be poured on the plate; after the albumen has spread evenly over the surface of the wet collodion, the superfluous quantity may be drained back into the large bell mouth end of the filter; by this means a constant supply of fresh filtered albumen is always at hand.

A visnometer is a small instrument extremely useful to the tourist when either out for the purpose of photo-

graphy or merely on a ramble; it consists of a square tin case, conical shape, and is for determining if a view or scene is applicable for photography—without setting up his camera he will at once see how much of the landscape he will obtain on his focus screen; of course these instruments are only applicable for the lens they are made to suit.



Fig. 12. Fig. 13. Fig. 14.

A glass measure, *fig. 12*, is useful not only for measuring quantities of different fluids employed, but also for containing the developing solution when in use: it having a convenient spout, the solution may be poured from it on the plate more readily than from a bottle.

Fig. 13 represents a collodion bottle. As collodion constantly is depositing a small portion of sediment, it is advisable to keep the bulk of your stock in a large bottle, pouring off just sufficient to use into a long bottle, as represented above, by this means small specks and streaks in the film are prevented.

A glass funnel, *fig. 14*, is used for filtering as well as

decanting solutions; two or three will be required to use for different solutions.

A set of scales and weights is necessary in making the solutions; they should have glass pans, and are supplied with weights up to two drachms; the pans must be kept scrupulously clean; it will be better to weigh the chemicals in a small piece of paper to prevent contamination, placing a piece the same size in the opposite scale to counterpoise the weight.

For developing the picture a levelling stand is required; by means of three screws underneath, the plate is levelled, and then the solution poured over it. Instead of this, many operators use a glass dish.

Porcelain pans are required for the printing process; not less than two will be advisable, but three will be far more convenient.

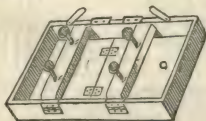


Fig. 15.

Pressure Frames, as shown by *fig. 15*, are used in the printing process; the best are now made, not only with jointed backs, but also with springs instead of screws, to secure a more even pressure.

Those operators who desire to work by the ordinary wet collodion process will be compelled to have recourse to a dark room or tent, to excité and developé their plates;

for this purpose I have designed a small tent, which, while it gives ample room for manipulation, is extremely portable; the outer case, which is about two feet nine inches long by six inches wide and four thick, opens out and forms the table, this is supported on a low tripod stand, and from each end rise two iron rods, which carry the cover overhead, *Fig. 16* represents the tent as arranged ready for use; *fig. 17* when packed for travelling.

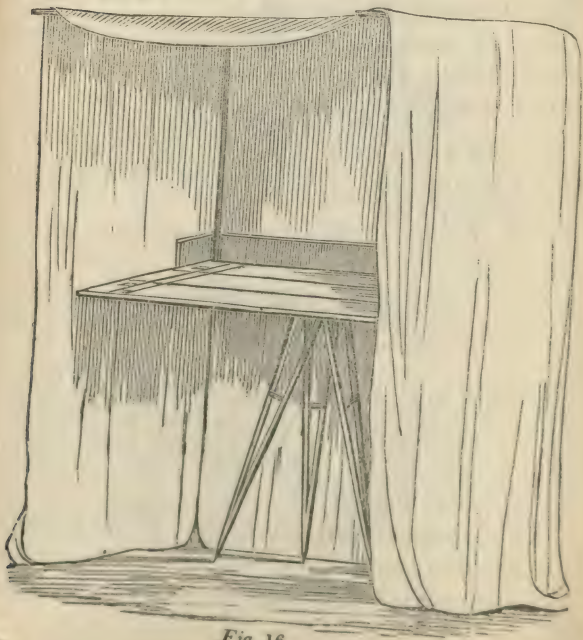
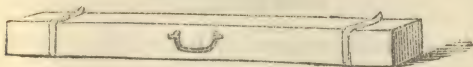


Fig. 16.

*Fig. 17.*

To fix it up for use, first unbuckle the straps that keep the case close, and fit up the small tripod stand ; on this place the table, which is formed by opening the packing case, and fasten the table to the stand by means of the brass bolt and screw ; then raise the iron arms at each end of the case, these form the support to carry the calico overhead, and throw the cover over the whole, In very windy weather it will be advisable to peg it down at the corners. Of course, in selecting a spot to raise a tent, an exposed position should be avoided, and, if practicable, out of the direct sunshine.

The tent before described is intended for pictures any size up to 15 inches by 12 inches, but for smaller plates a more simple and much lighter construction will suffice, more particularly described at page 58 ; it is extremely light, and for stereoscopic plates or pictures up to 7 inches by 6 inches, very commodious. The most suitable form of camera for the wet collodion process, is likewise described at the same page

Chemicals.

The chemicals required by the tourist will be better purchased in their pure state than manufactured by him ; the following are the principal used in the dry process.

COLLODION is readily made by dissolving gun-cotton in ether and alcohol. The formula as follows: Take two ounces of ether and three drachms of alcohol, to which add six grains of gun-cotton ; by frequently shaking the bottle the cotton will readily dissolve ; keep this in a stoppered bottle, and mark it "Plain Collodion." In another bottle make a solution of iodide of ammonium thirty grains, alcohol one ounce ; mark this "Iodizing solution."

When wanted for use, mix one drachm of iodizing solution with seven drachms of plain collodion, shake the bottle well up, and after standing a short time the clear portion may be poured off ready for use: this collodion gives very pure and intense negatives, when used whilst the plate is wet, and is most suitable for the oxymel process, page 63.

The collodion for the dry process is made by taking about three ounces of iodized collodion made as before directed, and adding to it two drops of tincture of iodine, two drops of chloroform, and one drop of glycerine ; it should be well shaken to incorporate the

mixture, and allowed to settle a day or two before required for use. This collodion will be about the colour of port wine, and will remain good for the dry process any length of time. These directions will enable amateurs, or others, to prepare a suitable collodion for themselves ; of course care must be taken to obtain a soluble cotton, that has been made at a high temperature. If made in large quantities, suitable for sale, a different method of preparation will be better, but there are many difficulties that cannot be readily comprehended by those who do not have constant practice.

NITRATE OF SILVER that has been fused at a low temperature is recommended for making the exciting bath, in its absence the ordinary crystallised silver may be employed ; for the printing process the crystal silver answers equally as well as that which has been fused.

BROMIDE and IODIDE of POTASSIUM are used in preparing the iodized albumen, a small portion of free iodine is also recommended, but it must be cautiously used.

GLACIAL ACETIC ACID is a chemical that must be used particularly pure to succeed well, as it plays a very important part in keeping the picture clean and free from stains : to test this acid dissolve a few crystals of nitrate of silver in two or three drops of water, and add to it a drachm of the glacial acid ; the mixture

should preserve its brightness even when exposed to the light.

KAOLIN or China Clay is useful in restoring the colour of the silver bath, as nitrate of silver rapidly becomes discoloured by the immersion of the albumenized plate ; a small portion of this earth should be kept in the bottom of the bottle, it will by this means purify the bath and prevent the solution getting so dark as to affect the picture.

GALLIC ACID is the best agent for developing waxed paper proofs, and also, as a general rule, for the dry albumenized collodion plates ; but in cold weather, or if the plate has not had sufficient exposure, a slight addition of pyrogallie acid will be advisable.

HYPO-SULPHITE OF SODA is the best fixing agent I have yet employed for this process ; it does not act so quickly as the cyanide of potassium, but the film being tough the iodide of silver is generally rather difficult to remove, and I have found cyanide injure the depth of the picture before it had accomplished its work, therefore I should give the preference to the soda.

In the printing process soda is used to a great extent, and I will here caution the amateur to keep the measures and pans that are used for this chemical entirely separate from those used for the other solutions.

CHLORIDE OF GOLD is always to be used in toning paper pictures, as permanence cannot be secured without it ; this salt is likewise freely adulterated, and hence many disappointments arise.

In filtering solutions, &c., use pure filtering paper ; the best description is sold in packets of a hundred circles ; by folding the circle into four it will fit the funnel, and the solution will percolate through ; for other purposes, such as draining the plates on, &c., that sold in sheets under the name of bibulous is preferable.

For the waxed paper process the chemicals required for sensitizing, developing, and fixing, are nitrate of silver, glacial acetic acid, gallic acid, and hypo-sulphite of soda ; the paper I should recommend to be purchased ready waxed and iodized.

Dry Collodion Process.

NEGATIVES BY ALBUMENIZED COLLODION.

THIS beautiful process, first published by Dr. Taupenot, in the Autumn of 1855, possesses many advantages over any other preservative method that has yet been known ; its extraordinary amount of detail, and certainty of success, has, to a very considerable extent, led to its popularity. Since it was originally given to the world, there have been many modifications, which have added to the simplicity, and now I can guarantee to perfect any amateur in three or four hours to secure nine or ten good pictures from a dozen plates.

The whole process, for convenience, we will divide into eight operations, viz. :—

- 1st—Cleaning the Plate.
- 2nd—Coating with Collodion.
- 3rd—Sensitizing the Collodion Coating.
- 4th—Coating with Albumen.
- 5th—Exciting the Albumen Solution.
- 6th—Exposure in the Camera.
- 7th—Developing.
- 8th—Fixing.

CLEANING THE GLASS.

This is, in all the branches of Photography, one of the most important points, and which by beginners is not carefully considered ; but as the film, after having been dried twice, and again moistened to develope, has an inclination to rise in blisters, especial care should be taken to have as pure and clear a surface as possible. The best method of cleaning glass is that recommended by Mr. FISHER, of Yarmouth. He says, " Having selected a piece of glass free from blemishes, proceed to clean them, by washing with water in which a little cyanide of potassium has been dissolved : this is to free them from all traces of grease. They should afterwards be well rinsed in some clean water, and wiped dry with a linen cloth: then mark one side, and rub it well with a small bung or cork, using a mixture of tripoli, nitric acid, and water, say—

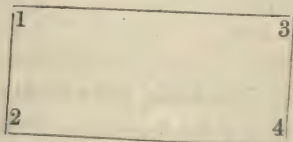
Tripoli	...	...	...	$\frac{1}{4}$ ounce.
Nitric Acid	...	...	...	1 drachm.
Water	...	...	...	2 ounces.

rinse it again in clean water, and wipe it dry ; then lay it face upwards on a flat board, and polish well with a wash leather that has been washed, to free it from the dressing used in the manufacture. By breathing on the glass the surface may be more readily seen, and if any smears are visible, wash and clean the glass again, but on no account touch the surface with the hand after it

has been polished. The readiest way will be to clean a stock before commencing operations, and stand them by in a plate box until required."

COATING THE PLATE WITH COLLODION.

The best collodion for this purpose is one that, when dry, presents a fine granular surface, and not glutinous or reticulated; as the sensitiveness of the collodion is not a matter of any moment, the old useless negative collodion may generally be used, by adding three or four drops of pure rectified ether to the ounce; but in default of this, use a thin iodized collodion, in which a slight quantity of iodine has been added. The publisher of this work prepares a collodion for this purpose. To pour the collodion on to the surface of the clean plate, proceed as follows:—Hold the glass plate between the fore-finger and thumb of the left-hand, by the corner marked No. 1.



Then pour on the centre of the plate a sufficiency of collodion, letting it run towards the corner marked No. 2, slant the plate so as to cover the end of the glass towards No. 1, taking care to avoid the thumb: then incline the plate so as to cover No. 3, and finally drain off the

superfluous quantity at corner No. 4, returning it into the bottle. Whilst the plate is draining it must be kept vertical, and a slight rocking motion should be given to it to prevent the waves or lines that otherwise would be formed. When the plate has had time to drain it is to be immersed in the nitrate of silver bath, in order to

SENSITIZE THE COLLODION COATING.

This bath is to be made by dissolving the nitrate of silver in distilled water.

Solution A.

Fused nitrate of silver	8 drachms.
Distilled water	2 $\frac{3}{4}$ ounces.

Let this thoroughly dissolve. Then mix,

Solution B.

Iodide of potassium ...	4 grains.
Distilled water ...	2 drachms.

When this is dissolved, pour it into the silver solution A, stirring it the whole time with a glass rod, to insure perfect mixing; the precipitate of iodide of silver that was at first thrown down will almost immediately redissolve, and the solution will be at once perfectly bright and clear; then add—

Distilled water	12 ounces.
Alcohol	1 drachm.
Ether	1 „

Shake it well up and filter, to clear it from the fine precipitate which is again formed, when it will require to

be filtered two or three times through the *same* filtering paper: afterwards add—

Glacial acetic acid	...	$\frac{1}{2}$ ounce.
Kaolin	... ..	3 drachms.

Keep this solution in a stoppered bottle.

When required for use, filter a sufficient quantity into a gutta percha dipping bath, *fig. 9*, and the same is ready for use. The glass plate that has been coated with collodion is to be laid face upwards on the dipper, which is supplied with the trough, and immersed steadily into the solution, where it should remain from one to two minutes, or until the greasy appearance is removed; to facilitate this, after it has been immersed, say half a minute, raise it up and down two or three times. This will have the effect of evaporating the ether much quicker, and producing a more even film, If the proper precautions have been taken, the plate at this period presents a clear blue-white semi-opaque appearance, something resembling ivory. It then should be removed, holding the glass between the fore-finger and thumb by the corner it was previously held by whilst coating with collodion, and just resting for a minute the corner marked No. 4 on several thicknesses of blotting paper; lay it on a levelling stand, and pour over the surface a good stream of pure soft water for several minutes, in order to remove the nitrate of silver solution; this requires to be very carefully and

thoroughly done, or marks will be left in the film. Drain off the water, and it is then ready for the fourth operation, viz.:—

COATING WITH ALBUMEN.

Iodized albumen is best prepared by mixing albumen with glycerine, and the bromide and iodide of potassium, and perhaps the most simple method will be to proceed by taking two *new-laid* eggs, and carefully separating the yolk from the white, which only is to be retained ; this will be found to measure about two ounces, and should be put into a small basin or measure, and well beaten into a froth with a silver fork or bundle of quills. Then pour it into a 4-ounce bottle, where it should rest a few minutes to allow the froth partially to subside, and add to the albumen the following :

Distilled water	...	...	$\frac{1}{2}$ ounce.
Iodide of potassium	...	...	8 grains.
Bromide of potassium	...	...	2 grains.
Pure iodine	...	...	$\frac{1}{2}$ grain,

These are to be dissolved in the water in the order given, taking especial care not to add too much free iodine, or it will coagulate the albumen. Pour this iodizing solution into the albumen, and shake it well up for two or three minutes, afterwards add :—

Glacial acetic acid	...	...	6 drops.
Glycerine	...	...	1 drachm.

Again shake it well, and after it has been filtered it is

ready for use. As albumen is too thick and glutinous to pass through filtering paper, a small piece of sponge will be a convenient substitute. Lightly press a small fragment into the neck of a glass funnel, and let the albumen filter through it several times, until it is perfectly clear and limpid. Do not press the sponge too tight into the funnel, or it will prevent the albumen running through. Having prepared this solution, take the moist plate that has been removed from the sensitive bath, and pour over the surface (in the same manner as the collodion) the iodized albumen, using the filter *fig. 11*; it should be poured over several times, in order to get an equal film, free from floating particles, or air bubbles. They are then to be carefully dried in a room free from dust. In drying the plates, let them stand on several sheets of clean blotting paper, with the top of the plate touching the wall only at one corner. When they are *thoroughly dry* they may be stored in plate boxes ready for the next operation. Up to this point they will bear exposure to daylight without injury, therefore these operations may be conducted in any room where there is not a great excess of light.

When required for use, they are to have the

ALBUMEN COATING EXCITED

by immersion in the aceto-nitrate bath, as before used for exciting the collodion film, see page 23. The plate

will require to remain in this bath for about one minute, when it must be withdrawn, and again placed on a levelling stand ; the screws underneath are to be carefully adjusted so as to procure a level surface, and a small quantity of distilled water poured over the surface, after which, a much larger quantity of common soft or rain water is to be used, in order to remove all trace of nitrate of silver : unless this is well and carefully done, the plates will, to a certainty, be spoiled. The deposits of nitrate of silver that are formed in drying, produce a number of marks or feathers, which appear afterwards in developing the picture, therefore the water should be poured not only over the centre of the plate, but also round the sides and in the corners : when this is done, stand the plate in a dark cupboard or box to dry, using the same precautions as before, to prevent the plate touching the wall except at the top corner.

When the plates are dry they are to be stored away in a *dark box* for use. As they are now sensitive to light, care must be taken to preserve them from exposure to it ; the safest plan is to keep them in tin plate boxes, which are perfectly impervious to light, and do not injure the plates by vapour, which most wood boxes will do if they are kept any length of time.

EXPOSURE IN THE CAMERA.

The plates may be exposed either immediately they are dry, or kept two or three weeks, if required. The

form of camera most suited to the purpose having been selected, the focus is to be obtained on the ground glass, by moving the lens either backwards or forwards until the greatest amount of distinctness is obtained, and then the dark frame containing the prepared plate is to be inserted: the wood slide or shutter to be raised, and a dark cloth thrown over the camera, to guard against any light reaching the plate except that which passes through the lens. Next remove the brass cap or shutter of the lens, and expose the plate to the action of the luminous ray. The time of exposure is not an object of so much importance, as the development may be suited to rectify any little error, but as a general rule about double the time required for wet collodion negatives will be found sufficient, that is with a stereoscopic lens of $4\frac{1}{2}$ -in. focus, and a $\frac{1}{4}$ -in. stop in the shade about two minutes and a half to three minutes; but in the sunshine, half, or even a third of this time will be ample. Again, with a lens of 14-in. focus, and an aperture of $\frac{3}{4}$ -in., in the summer sunshine, about two minutes and a half to three minutes. After the plate has been exposed the necessary time, the brass cap is replaced, and the dark frame containing the collodion plate removed from the camera, taking care to close the wood shutter; they are then ready for the next process—

DEVELOPING,

which may be done at once, or deferred several days, if

required. The best solution for this purpose is a mixture of gallic acid and nitrate of silver ; take—

Gallic acid	...	...	3 drachms.
Distilled Water	...	...	12 ounces.

Put this into a stoppered bottle, and shake the whole well up ; let it stand a few hours in a warm room or before the fire, in order to dissolve as much acid as possible, but there will always remain with the above proportions a small quantity undissolved at the bottom of the bottle : to this add—

Alcohol	...	...	...	1 ounce,
Glacial acetic acid	...	...	...	$\frac{1}{2}$ „

Just previous to commencing the development of the picture, pour about half an ounce of the gallic acid solution into a *clean* measure, at the same time filtering it through filtering paper, and add to it two or three drops of the silver bath, not more.

The plate, on being removed from the camera slide or dark box in the operating room, should be placed face upwards on a levelling stand, and a small quantity of distilled water poured over the surface, letting it remain there several minutes, in order to moisten the film previous to commencing the development. After the albumen film has been softened the gallic acid solution should be poured over the surface, and allowed to remain there two or three minutes, when a slight trace of the picture will be seen. At this stage of the

process the picture must be drained of the developing solution and held up to the light ; by this means, on looking through the plate you will observe if any stains have made their appearance. Should this be the case, they may be removed by taking a small piece of cotton wool and carefully wiping the albumen surface, then wash the plate with a gentle stream of soft water, and apply the developing solution again; but this time about twelve or fifteen drops of the bath solution should be added to the gallic acid. In a short time the plate will have acquired the requisite amount of density, when the further development is stopped by washing with a stream of pure water.

The plate should now be again thoroughly examined, and if any stains are visible they possibly may be removed by wiping the surface with a piece of *clean* cotton wool, and afterwards well washing with more water. The time requisite for development will vary very considerably, depending on the amount of exposure the plate has had ; but as a general rule from twenty minutes to half an hour will be sufficient. This time may be very materially reduced by adding to the gallic acid solution a few drops of the ordinary pyro-gallic acid developing solution, as used for wet collodion negatives, but not until after the picture has begun to make its appearance, as with a rapid development there is a disposition to stain the film ; however, it is often very convenient to be enabled to force a picture out,

especially in cold weather, or when the plate has not had sufficient exposure in the camera. The appearance of the negative will determine if the proper time of exposure has been given to the plate or not.

Should the picture not present the proper contrast of light and shade, which is requisite for the printing process, but is of a uniform dull colour, the sky being too transparent, and the details indistinct, the time of exposure in the camera has been too long ; but in an under-exposed plate the sky is very dark and opaque, while the dark parts of the picture are entirely without detail, and in the printing process will only produce blacks and whites, without half-tones.

Perhaps the most simple method will be, before starting on a tour, to expose a plate in a moderate light, say two minutes, and develope it : then expose another in the same camera immediately afterwards, allowing four minutes ; the comparison between the two will afford the experience necessary. I have found as a general rule that over-exposed plates have given better results than those which have not been sufficiently illuminated.

When the developing solution on the plate turns thick before the plate is finished, it must be thrown away and more mixed, *previously washing the measure which contains it*, and on no account return the developer that has been used on the plate to the fresh solution ; the value of the gallic acid is so very trivial that it should

be used freely, but always filter it immediately before using. Instead of placing the plate on the levelling stand to develop, it may be laid in a shallow glass pan, and the solution poured over it, but I do not recommend this, as the dirty solution is not so readily removed as by the former method.

FIXING SOLUTION.

In a wide-mouthed bottle dissolve:—

Hypo-sulphite of soda	...	5 ounces.
Soft water	... ..	1 pint.

The plate should be either laid in a porcelain pan, face upwards, and covered with the above solution, or placed on the levelling stand, and the fixing solution poured over it until the semi-opaque yellow film is removed, which will be the case in a few minutes, when the process of washing must be again carefully performed: should the hypo-sulphite of soda not be removed, the crystals formed on drying will quickly spoil the same from being of any further use. To insure freedom from this salt, it will be better to hold the picture under a small tap of running water in preference to immersing it in a pan or vessel. It must then be stood on end to drain and dry, to assist which it will be advisable to rest the bottom edge on a few thicknesses of blotting paper, or it may be hastily dried over a spirit lamp or before the fire: as a further precaution the hands should be washed with soap and water to free them from the

hpyo-sulphite, else the next picture will suffer from the neglect. When the plate is thoroughly dry, it must be varnished to protect it from injury whilst printing.

The hardest varnish, and most durable for negatives, is amber dissolved in chloroform ; this is to be poured on the centre of the plate in the same manner as recommended for collodion at page 22, returning the superfluous quantity into the bottle, again using precaution to prevent particles of dust from settling on the surface. This varnish will dry in a minute or two, when the picture is finished, and may be used for the production of paper or glass positives in any number, by the method described at page 41.

Waxed Paper Process.

This process recommends itself to the amateur on account of its simplicity, and likewise on account of the extreme portability of the apparatus necessary. It is more applicable for large views than for stereoscopic subjects, as the detail is not so fine as in negatives taken on glass plates, therefore small views will suffer much in comparison with larger ones.

The negative is taken in the camera on paper, which afterwards is used as a negative to produce positive proofs. The object of preparing the paper with wax is to close the pores, and render it of a more even texture. The method of preparing the paper with wax, and also of IODIZING it, which are the preliminary operations, are rather difficult and tedious to perform, but the paper can be procured ready for exciting in the silver bath, thereby avoiding much inconvenience.

TO WAX THE PAPER.

Obtain the purest white wax without admixture of stearine or spermaceti, common white wax of the shops will not do. Melt this in a shallow dish, and soak the sheets of paper until completely saturated. As it rapidly cools, the pan containing the melted wax should

be fixed over a vessel containing hot water ; by this means a more even temperature is obtained. A common hot water dish or plate answers extremely well. When the papers are well soaked, hang them up before a fire so long as any wax continues to drop ; afterwards place them between two pieces of plain paper, and enclose the whole in several folds of blotting paper. Pass a warm iron over this two or three times, when they will be ready for iodizing ; be careful the iron is not too hot, or it will spoil the wax and stain the paper. A sheet well-prepared ought not to have any shining points on its surface when viewed by the light, and should be equally transparent.

TO IODIZE THE PAPER.

Mix in a dry state:—

Iodide of potassium	...	8 drachms.
Bromide of potassium	..	1 drachm.
Iodine	... ..	5 grains.
Cyanide of potassium	...	2 „

Care should be taken not to touch the iodine with the fingers—now dissolve:—

Sugar of milk	... ..	8 drachms.
Distilled water	... ..	1 pint.

and add the former mixture to it ; when dissolved, filter through a piece of muslin. Instead of the distilled water, many operators use rice water, which is made by boiling gently an ounce of rice in a pint of water for

half a minute, and while warm filter through a piece of fine muslin, and strain it when cold.

To prepare the paper, pour this solution into a porcelain pan, and immerse the sheets one at a time, until you have five or six soaking, taking care to prevent any air bubbles from remaining underneath; allow them to soak from a quarter of an hour to twenty minutes, and then turn the mass over and remove singly, hanging them up to dry, by pinning them up to dry on a line, using pins that will not injure the paper; at the bottom corner of the sheet attach a small piece of bibulous paper, which will more readily absorb the moisture, and cause the paper to dry quicker and more evenly. The sheets when dry should be placed in a portfolio until required for use, care being taken not to touch the surface with the fingers, or to expose it to any heat, or the wax will be disturbed, and prevent the nitrate of silver from penetrating to the iodide in the paper.

In this state it will retain its properties for a considerable time, and may be exposed to the light without injury. The iodizing liquid that remains after this operation may be kept for future use, simply filtering it before it is used.

The papers being cut to the size required for use in the camera, the next operation is

TO SENSITIZE,

which is done by immersing the paper in a solution of acetic nitrate of silver, prepared by

Nitrate of silver ...	...	50 grains.
Distilled water ...	...	1 ounce.
Glacial acetic acid ...	...	1½ drachm.

As this paper will keep several days, or even three or four weeks, if excluded from the light, the readiest way will be to prepare a number at once, and for this purpose they should be immersed separately in the solution until you have five or six soaking; let them remain there about ten minutes, or until the purple tint which the paper acquired in the process of iodizing, is removed; when this is the case, remove them singly, and plunge them into another porcelain pan, containing distilled water. Let them remain here three or four minutes: then remove them into another pan of water. By this means they may be preserved sensitive some considerable time before used, remembering that the oftener they are washed the longer they will keep, but the less sensitive will they be. After the final washing, lay them between sheets of clean white bibulous paper to dry. A packet of ten or twelve sheets may by this means be made, if you put two sheets of bibulous paper between each sensitive sheet; but it must on no account be hung up to dry, or dried hastily, but allowed its own time between the folds of the bibulous paper. As the paper

is now sensitive to light, it must be carefully preserved, and only exposed in the operating room, or by the light of a shaded candle.

THE EXPOSURE IN THE CAMERA

will vary with the light and the nature of the object, from five minutes to a quarter of an hour. With a lens of 15 or 16-in. focus, using a stop of about $\frac{3}{4}$ -in. diameter, in a moderate good light, the sun not shining on the object, about a quarter of an hour will be required, that is supposing the object is moderately well lighted ; but if it is a scene containing a group of very dark trees or foliage, longer time must be given. Should the sun be shining on the scene, half the exposure will be sufficient. However, after the paper has been exposed in the camera—the dark slide of which for this purpose is made with two plate glasses, to enclose the paper and keep it flat—it is ready for the next operation, which is

DEVELOPING THE PICTURE.

This portion of the process may also be delayed several days if desired, (of course in the mean time the waxed paper has to be carefully preserved from exposure to the light) or it may be proceeded with at once.

The agent for developing the picture is a saturated solution of gallic acid.

Gallic Acid	...	...	3 drachms.
Distilled Water	...	...	12 ounces.

Mix these in a stoppered bottle, and stand it in a warm room for a few hours, occasionally shaking the bottle. When required for use, filter sufficient into a porcelain pan to the depth of about a quarter of an inch, and add a drop or two of glacial acetic acid, and the same quantity of alcohol: then plunge the paper into this solution, where it to remain undisturbed for a few minutes. As soon as traces of the picture begin to appear, add a few drops of the acetic nitrate of silver, such as was employed to render the paper sensitive. The picture then rapidly begins to make its appearance if the exposure has been properly timed; should, however, the picture have been under-exposed in the camera, it will be very tardy in developing, yet by giving it more time it will eventually appear. When it is sufficiently intense, which will be known by the high lights being opaque, and the darker shadows moderately shown, it must be washed in a fresh dish of water. The time required for development will vary considerably, depending upon the amount of exposure the paper has had, and if it has not had quite enough, it may be rectified by giving a little more time to develop—but this extremity should not be resorted to unless it is compulsory; the picture ought (if all the previous proceedings have been properly timed) to be fully developed in about half an hour; still I have had instances where three or

four hours have been requisite, but in these cases the developing solution must be frequently changed, or it will discolour the picture.

The next operation will be

FIXING THE NEGATIVE.

All that is required for this is to remove iodide of silver, and must be done immediately after developing. Having first washed the picture in clean water, immerse it in the hypo-sulphite bath.

Hypo-sulphite soda	...	6 ounces.
Soft water	... ..	1 pint.

or as much soda as the water will dissolve.

It will require to remain in this from ten to twelve minutes to completely remove the iodide of silver ; if allowed to remain a longer time, the darker spots will suffer. The negative must be well washed after this to remove the soda, and then left for an hour or more in a large vessel of water to soak ; afterwards it must be carefully hung up to dry, and then held before a moderate fire to restore to the wax that transparency that it has lost by repeated washing, &c.

Positives are to be taken from these proofs in the manner as from other descriptions of negatives.

Printing Process.

The term "printing" means the formation of positive copies from the negative previously obtained. In order to render this more intelligible, it will be advisable to describe the difference between negatives and positives.

A negative picture is one that has the lights and shades reversed, that is to say, if you hold it up to the light and look through it at the sky, you will find that those objects which were white in the landscape are perfectly black or opaque in the picture, while black or dark subjects are transparent; by laying the plate on a piece of black velvet the details present an uneven and confused appearance, while with a positive picture the lights and shades are shown distinctly. It should be remembered that the pictures taken in the camera by the dry process are all negatives, consequently useless until the positive has been obtained from them.

Positives may be printed on paper or glass; if they are intended for stereoscopic pictures, better results will be obtained by printing on the glass, producing what are generally termed "transparent pictures." This method is also applicable for taking magic lantern sliders. Paper pictures are likewise taken from the

glass negative, and possess the advantage of more easy carriage, and are less liable to be damaged by accident. I will, therefore, give the directions for both processes, leaving the choice to the operator.

PRINTING ON ALBUMENIZED PAPER.

The plan of proceeding most generally adopted has been to saturate a sheet of paper with a solution of an alkaline salt, allowing it to dry, and subsequently floating it on a solution of nitrate of silver, by which means the surface of the paper becomes covered with a chloride of that metal.

The apparatus necessary for this purpose consists of a shallow glass pan, two or three porcelain pans, a glass rod, pressure frame, and albumenized paper; as the preparation of albumenized paper is a matter of some difficulty, and is seldom produced by the amateur so perfect as by those who devote their time to its manufacture, I should recommend that it be purchased ready for use rather than incur the risk of failure in future operations.

Previous to commencing, cut the papers into the size required, leaving a margin of about half an inch over the size of the negative, and mark with a pencil in one corner the prepared surface so as readily to distinguish it in the dull light of the operating room: the proper side will be readily known by its having a high gloss on the surface, it then should be examined, and only those

sheets retained that have an even coating free from spots or smears ; the paper in this state is unaltered by light, and may be kept any length of time if preserved from damp.

The first operation will be to

SENSITIZE.

The paper a short time before required for use is to be rendered sensitive, by floating on a solution of

Nitrate of silver	...	...	60 grains.
Distilled water	...	...	1 ounce.

Let this thoroughly dissolve, and filter it into a glass pan, so as to have a depth of about half an inch, then in the dark room take the paper, and holding it by the two ends, using both hands ; let it slightly belly or fall in the centre, which must be carefully lowered so as to touch the surface of the silver, then gently lower the two ends until the whole is floating ; by this means the air bubbles which may form underneath are expelled. The paper will require to remain on the solution about three minutes, or from that to four or five minutes, to thoroughly saturate the coating of albumen, when the corner is to be gently lifted with a pair of wood or horn forceps, and the sheet hung up in the dark to dry ; should a pair of forceps not be at hand, a piece of clean wood may be used for the purpose, and after it has been

raised, a corner of the paper may be taken between the fingers, and pinned on to a line to dry ; to facilitate the drying, attach a small portion of filtering or bibulous paper to the bottom corner of the sheet, which will rapidly absorb the moisture. All this, and the following preparation, should be done in a dark room, or by the light of a candle, as the paper now is sensitive to the action of white light.

The silver will be found to discolour by the action of the albumen ; to prevent any injurious effects from this cause, after having prepared about half a dozen papers, return the solution into the bottle, and add to it about a quarter of an ounce of kaolin, shake the whole well up, and after it has had time to subside, filter it again for use into the glass pan. I recommend glass pans for the silver solution, as porcelain absorbs to a greater extent the chemicals that are used in them. When the paper is thoroughly dry, we may immediately or, if more convenient, delay for a day or two the next process, which is

PRINTING THE POSITIVE.

The negative is to be laid face upwards on the glass of the pressure frame, the paper over this, albumen side downwards, bringing the whole into close contact with the pressure board, then close the cross bars or arms and remove the whole into the daylight, turn the frame face upwards, and expose it if possible in the

full direct light of the sun ; if this is not practicable, as is often the case in winter, let it stand in as bright a light as possible ; the time of exposure will be, with a bright sunshine, from five to ten minutes, or according to the light, up to three or four hours : but the correct time may readily be determined by examining the progress of the paper during the process ; remove the pressure frame into the operating room and unfasten one of the cross bars, then lift half of the back-board, which is jointed for the purpose, and the proof will then be seen ; this should be allowed to attain a color several shades darker than it is intended to remain, as it loses its depth considerably in the next process, which is

FIXING AND TONING.

There have been various methods in use for the security of the permanence of the finished picture, as well as the production of a pleasant tone or shade ; after some years constant practice I have found the following to be far the most certain and permanent method which I have tried :—

On removing the print from the pressure frame, if properly exposed as before described, it will present a dull red unpleasant colour, and the whites will be darkened to a light buff shade, but which will afterwards be removed, when the finished picture will present a natural appearance.

The first operation will be to wash the picture under

a stream of running water for a few minutes, in order to remove the silver that remains on the paper; then prepare the **FIXING BATH**, by dissolving—

Hypo-sulphite of soda	...	6 ounces.
Soft water	... ..	1 pint.

Filter this into a porcelain pan, and thoroughly immerse the wet paper picture into it; the dark colour will rapidly disappear. When it has reached the proper depth, or the whites are pure, it should be removed and plunged into the **TONING BATH**, prepared, by dissolving in a porcelain pan—

Hypo-sulphite of soda	...	4 ounces.
Soft Water	.. ...	12 „

And in another vessel the *Gold Solution*, which is made by dissolving—

Chloride of gold	... ..	4 grains.
Distilled water	... ..	1 ounce.

Mix them slowly, one drop at a time, carefully stirring it with a glass rod,—it afterwards should be filtered. The *gold solution* must be poured into the *hypo-sulphite of soda solution*, and then carefully filtered into another shallow pan, and the picture immersed into this, when the colour of the print will change from red to black; as soon as the desired tint is obtained, remove the picture and well wash it with running water for several minutes, and, as a further precaution, let it remain soaking for half an hour in clean water, frequently

changed : by this means the hypo-sulphite of soda will be completely removed, and the picture may be considered finished.

The toning bath will become impoverished by use after working some time ; if the prints do not color readily, add a few drops of the gold solution, which will accelerate its action.

PRINTING ON SALTED PAPER.

Landscapes or buildings generally have a more artistic appearance when printed on Salted Paper ; the high gloss which is admissable in portraiture or stereoscopic pictures, is a great drawback in the larger views, moreover the black tone is easier obtained on this description of paper.

The plain paper, either Hollingsworth's or Canson's positive should be employed, and the first operation of

SALTING

is performed by soaking the sheets in a solution of—

Chloride sodium	...	40 grains.
Distilled water...	...	4 ounces.

Filter this into a porcelain pan, and lay the papers into it, a sheet at a time, pressing them down with a glass rod, until you have five or six immersed : let them remain here for about half an hour, and then hung up to dry. The paper in this state is perfectly insensible

to light, and should be carefully examined, and only those sheets retained that have an even and clear texture; also place a pencil mark on the rough side of the paper to more readily distinguish it in the dark operating room. The wrong or rough side may be readily known by the wire marks; but should there be any difficulty in distinguishing it, just wet one corner of the paper, when it will be clearly seen. Paper in this state can be readily obtained, fit for the next operation, and at a very reasonable price; the next step will be to

SENSITIZE,

And there are two methods of doing this; the first and best is by means of the *Ammoniacal Nitrate of Silver*, made in the proportion of 40 grains of silver to the ounce of water. First dissolve the silver, say—

Fused nitrate of silver ..	2 drachms.
Distilled water ...	3 ounces.

And add to this strong liquid ammonia, a drop at a time, until the black precipitate, which is at first formed, is re-dissolved; care must, however, be taken, not to add more ammonia than is necessary. Therefore, as a further precaution, after the solution has become clear, add a few additional grains of nitrate of silver, which will produce a slight turbidity. This solution, after having been filtered, is ready for use; it should be poured into a flat dish, and the paper allowed to float on the surface, leaving it to soak for five minutes, then

hang it up to dry in a dark room ; care must be taken not to wet the back of the sheet. Instead of using the ammoniacal nitrate, the paper may be excited on a plain solution of nitrate of silver, as described for albumenized paper.

Salted paper should not be printed too deep, or the whites will lose their purity, and it must be fixed in a dull light immediately after it is printed. There is no necessity that it should be done in the operating room, provided the full glare of daylight is avoided. When the picture is printed sufficiently deep, wash it well in several waters, and proceed to fix and tone in the same manner as directed for albumenized paper.

The readiest way of mounting paper positives is to make a strong solution of gum arabic, with hot water, and gum the print on a clean white card, leaving it under a moderate pressure for several hours ; afterwards revive the surface of the paper by passing a moderate warm iron over it.

PRINTING TRANSPARENCIES.

BY THE DRY COLLODION PROCESS,
FOR STEREOSCOPIC OR MAGIC LANTERN PICTURES.

Transparent positives may be obtained from the glass negatives, by two processes, one by the usual printing process in a pressure frame on the same principle as paper positives are produced, substituting a glass plate prepared by the dry collodion processs, for the excited paper ; or on wet collodion plates by the aid of a copying

camera, see page 68. If it is intended to print on an albumenized collodion plate, the manipulation will be the same as described at page 20, until the glass is made sensitive, then take the pressure frame into the dark room and remove the jointed back board, lay the negative on the plate glass with the collodion side *upwards* ; on this lay the sensitive glass, with the prepared side *downwards*, so that the two surfaces touch each other ; it will be advisable to put a layer or two of soft paper or flannel to prevent breakage previous to replacing the back-board, but next the prepared glass place a black paper or card, as the reflexion from a bright surface will impair the sharpness of the copy ; when all is ready close the arms which carry the springs, and cover the whole with a dark cloth ; next take the frame into the open air and remove the cloth, exposing the frame to the action of the light.

The exposure required will be about six to eight seconds in the shade, (as the glare of the sun would be far too powerful) and when the time of exposure has elapsed, return to the operating room, where the plate is to be removed from the frame, and the picture developed in the same manner as described for negatives, see page 28 ; it is afterwards to be washed and fixed, when it is ready for mounting, either as a transparent stereoscopic picture, or for use in the magic lantern.

The color of the picture as produced by these means

is far from pleasant ; to improve it after the picture is developed and washed, fix it with a solution similar to that used for toning paper pictures ; say,—

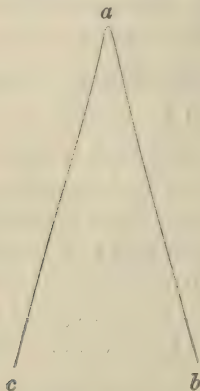
Hypo-sulphite soda	...	4 ounces.
Chloride of gold solution..		$\frac{1}{2}$ ounce.
Soft water	... ..	10 ounces.

The picture may lay in this to soak for a quarter of an hour, which will effect a great improvement in the tone. If the picture is intended to be used as a magic lantern slider, take especial care that the development is not carried too far, or it will cast shadows too deep to give an effective representation on the screen. For this reason the usual transparent stereoscopic sliders are not available for use in the magic lantern.

Should it be thought desiable, the operation of printing may be performed by gas-light, or with the light given by a moderateur lamp: in this instance the time of exposure will have to be increased to about five or six minutes; the pressure frame should be held as close as possible to the light so as to thoroughly illuminate the whole surface. In printing on glass care must be taken not to rub the two surfaces against each other, but lay them gently but firmly down, and on this the board of the frame; it is indispensable that the interior of the board be covered with black cloth, or card.

Stereoscopic Pictures.

The Stereoscope affords to the photographer the means of producing, with a small apparatus, effects, which otherwise would involve the necessity of a cumbersome camera, and the increased difficulty resulting from the employment of large plates. The picture for the stereoscope consist of two views of the same object taken from different points of sight, as will be illustrated by the following diagram:



Let *a* represent an object which is required to be photographed; place your camera at a convenient distance from it, say in the position marked *b*, and obtain

an impression on the sensitive plate: then remove the camera to the left, in the position marked *c*, and take another picture. When these are mounted, and viewed by the stereoscope, they will appear to stand in relief or convey the impression of solidity.

For landscapes, buildings, and still life, where there is not a likelihood of the object shifting its position, the ordinary view camera may be used, but I should not recommend it, unless on an emergency; however, as it is sometimes desirable to have the means of obtaining a stereoscopic picture when a stereoscopic camera may not be ready at hand, a few details will render it practicable.

First rule on the ground glass of the camera several vertical lines with a pencil, and then two or three horizontal across them; having fixed your camera on the stand and obtained the focus, mark on the ground glass the position occupied by some prominent object: then take a picture on a glass plate, about the size of half the stereoscopic plates, which will be $3\frac{1}{4}$ -in. by $2\frac{3}{4}$ -in. having done this, remove the camera to another position, to the left of the first, but as near as possible at the same distance from the principal object in the view, and again obtain the focus; when this is done observe the picture occupies the same position on the focussing screen, which is readily ascertained by means of the pencil mark previously made; should it not do so, a slight movement of the camera will rectify it. You will here

again take a photograph of the view, which will require to be mounted by the side of the one previously taken, for use in the stereoscope: but the picture taken first or in the position of *b* must be mounted on the card to the left of the other, or in a reversed position, else the stereoscopic effect is not produced. The distance between the two positions is not a matter of so much importance as may be supposed. I should recommend that the two points of sight be not separated more than one foot for every hundred feet distance from the principal object.

For convenience, the stereoscopic camera mounted on parallel laths, with a sliding back is recommended. It consists of an ordinary camera mounted on two bars, which allow it to be rapidly moved from right to left, without disturbing the position of the image upon the glass, and at the back of the camera is an oblong frame to carry a glass large enough to hold both pictures: this frame also slides from right to left, in a groove, so as to bring the opposite ends of the glass plate at different times before the lens.

One end of these bars or parallel laths is fixed to the bottom of the camera, while the opposite ends are pinned to the bottom board or table, but are capable of being moved by a double screw, so as to bring them closer together or separate them, if required, so as to suit objects at different distances. This arrangement is suitable for portraits as well as views.

To take a stereoscopic picture with this description of camera, you first (having fixed your camera on the stand) move the camera on the bars to the extreme right hand side, and focus for the view, marking the position of the objects as before directed ; then slide the camera to the left and observe if the view or picture retains the same position on the focussing glass ; should it not do so, alter the position of the parallel bars by turning the screw attached to them. It will be found that there is a point at which the image will remain fixed or stationary on the ground glass, while the camera is moved to and fro : now again place the camera on the right hand side, and insert a plate holder containing the prepared glass : remove the brass cap which covers the lens, and give it the necessary exposure. Replace the brass cap on the lens and slide the camera *to the left*, also slide the plate holder containing the plate *to the left* : remove the cap again, and expose the plate for the other picture, after which it is ready for developement.

In using the Tourist's camera, *fig. 2*, care must be taken to close the dark slides or shutters in removing the plate holder from the camera ; also remember that the plate holder must be moved from right to left, *or in the same direction as the camera*,

At the present time the Binocular cameras are very much in vogue for stereoscopic purposes ; the advantage they possess is simplicity in working and the

greater rapidity of action, as both pictures are taken at the same time; but for distant views they do not give quite so much relief or stereoscopic effect, in consequence of the two points of sight being so close together; at page 12 of the catalogue will be found the prices of the cameras suited for tourists. The Binocular tourist's camera is so arranged that the packing case forms the body of the camera, and the extra dark slides for the prepared plates pack in another compartment underneath; where it is intended to use either dry collodion or oxymel preserved plates, it forms the most portable form of apparatus: if the operator prefers to develop the plates on the spot and works by the usual wet collodion process, the bottom of the case may be used for the chemical bottles and the bath, instead of the extra dark slides; or the Latimer Clark's camera previously described can be fitted up for the same purpose, with chemical bottles, bath, &c., packing into the outer case.

Wet Collodion Negatives.

It is not my intention to describe minutely the manipulation of this process, but simply to give such hints as are likely to assist the tourist if he decides on working with wet collodion plates. The mere tyro in the art is referred to the "*Compendium of Photography*" for the elementary principles, and recommended to get tolerably proficient in manipulation at home before he ventures in the field. However, supposing that experience gained, a few modifications will be rendered necessary when working in the open air, and likewise a description of the apparatus best adapted for the purpose may be acceptable; the great aim being to secure portability and retain efficiency. I have no faith whatever in so-called developing boxes, or any contrivance where the results are left to chance; many ingenious inventions have been made for developing, &c. in a box, the arms of the operator being inserted through a sleeve, and the progress of the picture watched through a piece of yellow glass, but except in the hands of a very clever operator, they are totally useless; and then it is more by accident than skill that the picture is fully developed, without being carried too far, or stopped before the detail is brought out; this operation—the most delicate in the whole range of photography—requires a sharp eye and

quick hand to manipulate with certainty, and therefore some kind of portable tent is absolutely essential: at page 14, is a wood cut representing the most convenient form I have ever used for large plates, say up to 15 by 12; it stands very steady, and gives plenty of room for working; there is a flexible sink at one side, with an india-rubber tube to carry off the waste water; but for small plates, say stereoscopic size or 7 by 6, I have a simple tripod made very light, with a table supported between the legs; it does not weigh more than 10 lbs. and answers admirably. Presuming the intention is to take stereoscopic pictures, the following is a description of camera I have had in use some time, and which has fully answered my expectations as far as convenience and satisfactory results are concerned.

The camera is made of light Spanish mahogany as small as possible, packing into a box 14 inches by 11 in. and 7 deep, similar to the tourists' camera, *fig. 2*, page 6; (it however has only one dark slide, instead of six) the rest of the case has divisions for bottles to hold full sufficient chemicals for a day's use, the tight top bath, and a rack to hold a dozen glasses or finished pictures; there is also a space for the cloths and leathers: this, when the chemical bottles are filled, with the top of the stand and ready for use, will weigh under 11 lbs., therefore, taking this in one hand, and the tent and stand

legs strapped together in the other, there is not more than one person can easily carry : of course if away from home for several days an extra stock of glass plates and chemicals must be taken, but they may be left at the place where stopping, or sent forward by the carrier.

For large pictures, either a folding or bellows body camera is the most convenient; the camera, if a folding one, should be packed in a leather case, and the lens in a sling worn round the shoulder: another case will contain the bath and chemicals.

Having selected a suitable spot for the site to post the camera, first plant that and focus the view, then erect the tent and place inside it the dark slide of the camera, the bath, collodion, and a few pieces of blotting paper; take the cleaned glass in one hand, and get inside the tent, wipe the dust carefully off the plate, and coat it with collodion; immerse in the bath as usual, and be sure to allow it full time to get saturated, then take it out and drain well before putting it in the dark slide; when it is in the dark slide stand it up, resting on one side, while you replace the cover on the bath, this will often prevent disappointment, as it effectually prevents any splashes from getting into it; also take care never to lay the dark slide down flat, as the silver solution on the plate will flow back and certainly carry with it a stain from the wood of the plate carrier.

The collodionized glass is now to be exposed in the camera ; when it has had the full time close the shutter and carry the dark slide back to the tent, then in a glass measure pour sufficient developing solution to develop the plate, and in another sufficient water to stop the development when it has proceeded far enough, ~~or the~~ water bottle may be suspended from the top of the tent, and the supply drawn from a small stop-cock fitted on a piece of india-rubber tube ; when the developer has been washed off, the plate may be taken into the open air and fixed, of course not forgetting the final washing.

The reader is referred again to the "*Compendium of Photography*" for the constitution of the solutions used, but as they were more particularly intended for portraiture, a few hints will be of advantage to the tourist.

The collodion must be iodized several days before it is intended to be used, I always prefer it when at least six or eight weeks old : and as the popular prejudice against old collodion is gradually wearing off, it may be found a longer time even than this will be commonly given after it has been mixed.* However, when the collodion has been iodized some time, pour off the clear portion (for which purpose a syphon bottle is very convenient) into the bottle it is intended to work from ; for unless the

*These remarks are more particularly intended to refer to Fisher's collodions. Those preparations that turn to a dark brown colour in a few days after being iodized must be used fresh.

collodion has been allowed to settle several days and the clean portion only drawn off, it will be useless to take it out, as the shaking in carriage will render it thick and muddy.

The bath may be made precisely as described at page 24 of the Compendium, 4th edition. The developing solution I prefer for landscape work is made with glacial acetic acid instead of citric, as there is more intensity in the sky &c.

Pyrogallic acid.....	6 grains
Distilled water.....	4 ounces
Glacial acetic acid	1 drachm
Alcohol	10 drops

This solution keeps a week well unless in very warm weather, or it gets exposed to the sunshine.

When away from home for some time, it is as well to weigh up a few packets of pyrogallic acid before starting, it can then be mixed as it is wanted.

The formula for developing solution will be the best for general use, but in very hot weather a slight addition of acetic acid will be necessary, in most cases it will not require to be filtered : for instantaneous pictures the iron developer in Fisher's directions is the best to employ. The nitrate of silver bath is sometimes disordered by carriage, the best remedy is to add an excess of carbonate of soda until the solution will take up no more, then filter it and add a few drops of glacial acetic acid until the test paper shows the solution to be faintly acid, but

as a general rule when in a difficulty, try a modification of the developer, previous to tampering with the silver bath.

I have universally employed a weak solution of cyanide of potassium to fix the negative, having a very strong objection to carry hypo-sulphite of soda in a case with other bottles; besides, if soda is used, the hands must be washed after each picture, and that is not always convenient, especially when water has to be carried with the other apparatus: I always carry the water in a flexible mackintosh bottle, this folds up and goes in the pocket when not in use, and may be carried under the arm, or strapped over the back when full of water.

A few words respecting the water met with during a tour may prevent many disappointments.

The bath, of course, will be made before leaving home, and sufficient solution taken as an extra supply to replace the loss by evaporation, waste, &c., but should an untoward accident happen, I would, as a general rule, undoubtedly prefer spring water that had been previously boiled, to rain or river water. I have never had any difficulty in using common river water or filtered rain water for the developing solutions, but should endeavor, if the means were at command, to use distilled in preference to any other; in the neighborhood of London the ordinary supply of the River Company will do for all purposes except in preparing silver solutions.

Oxymel Preservative Process.

This process consists in preserving the moisture of the collodion film by a solution of honey and acetic acid which is termed oxymel, this is floated over the surface of the plate, and enables it to be kept 36 or 48 hours before development ; its chief merit consists in the simplicity of the manipulation and the softness of the resulting picture ; it has, however a few draw-backs the chief of which is the moist or sticky nature of the film and the positive necessity of the chemicals (bath, &c.) being in good working order. Oxymel plates may be easily prepared by any operator who is completely au fait at the wet collodion process, with almost a certainty of success, if he is careful to ascertain that his chemicals will produce a good, clear, intense negative by the usual wet process ; having satisfied himself on this point, there is no difficulty in obtaining a plate that will remain sensitive for at least two days ; the sensitiveness is about the same as in the albumenized collodion process described at page 28, or as general rule requiring three times the amount of exposure of a wet collodion negative.

TO PREPARE THE GLASS.

Select a piece of good patent plate, and remove the sharp edges either with a fine ragstone, or by drawing a

smooth file along the angles of the glass, then coat it with negative collodion, that has been iodized at least a week or ten days. allow it a full time for the film to set before immersion in the negative bath,* where it will remain until the surface is perfectly smooth and the solution runs off in an even sheet, when this is the case it is ready for the next operation, which consists of

APPLYING THE PRESERVATIVE SOLUTION.

This as before stated is a syrup of honey and acetic acid or oxymel; it is very easily procured from all dealers in photographic materials, or may be prepared by the operator himself, the formula is

Honey	$\frac{1}{2}$ pound
Acetic acid (not glacial).....	1 $\frac{1}{2}$ ounce
Water	2 ounces

put this into an open vessel or jar, and stand it in a saucepan of boiling water, until a white scum rises upon the surface, remove this two or three times when it may be allowed gradually to cool; when quite cold, dilute it with water in the following proportion :—

Oxymel	2 ounces
Soft Water.....	4 ounces

filter through filtering paper into a shallow pan, and it

*The full details of the manipulation are not here gone into, as it is presumed that the operator, previous to trying this process, is well up in the wet collodion negative process, for the constitution of the bath, see the "Compendium of Photography," 4th edition, or Fisher's directions, gratis on application, at 22, Skinner street. London

is ready for use ; another pan which has been half filled with water is required to wash the plate in. When the collodion film has been thoroughly saturated with the bath solution remove the plate and immerse it face upwards in the pan containing the plain common water, let it remain here two minutes, or until the water becomes milky from the silver solution washed from the collodion film, this water must then be poured away and a fresh quantity added ; by slightly tilting the pan, the water may be made to flow backwards and forwards over the plate, which it should do without leaving greasy lines upon the surface, when this is the case, remove the plate, and after a slight draining immerse it in the second pan containing the dilute oxymel, which is gently agitated for about half a minute, when the plate glass must be lifted out, and stood vertically on blotting paper to drain, this paper ought to be renewed several times or when it becomes wet ; of course all this must be done in a dark room, as the plate is sensitive to white light. After the plate has stood at least three or four hours to drain, it may be exposed in the camera, or kept for a day or two previously, at the convenience of the operator.

The form of camera best suited for working will be the same as for the albumenized collodion process ; that is for stereoscopic purposes either a Latimer Clark's camera with six backs as described at page 2, or a twin lens camera with six backs, as described at page 56 ; for

larger views the prepared plates are carried in a tin plate box, and transferred to the camera, by the aid of a hood or cover, the form of the camera depending on the taste or purpose of the operator, but decidedly the most portable is a bellows camera; whichever is employed the necessary exposure is given, and then the plate returned to the dark room in order to undergo the

DEVELOPMENT.

Of course up to this time, it has been carefully secured from all stray light, and the surface of the film protected from injury.

The developing solution is made by dissolving

Pyrogallic acid	4 grains
Distilled water	4 ounces
Glacial acetic acid	1 drachm
Alcohol	10 drops.

also in another vessel

Nitrate of silver.....	30 grains
Distilled water	1 ounce

then take the plate either by one corner between the forefinger and thumb of the left hand, or if a large plate by means of a plate-holder *fig 7*, and wash the film with a gentle stream of common water for a few minutes to remove as much as possible of the preservative solution, the developer is then to be poured over, previously mixing in a clean measure one or two drops of silver solution to a drachm of the pyrogallic solution ; this is

poured over the plate in the usual manner, the image quickly makes its appearance and deepens in intensity ; should the developer discolour very much before the picture is well brought out, throw it away and mix a fresh portion. In cold weather the quantity of nitrate of silver may be advantageously increased, or there will be some difficulty in bringing the detail of the picture well out, and in very hot weather, a larger quantity of acetic acid will prevent fogging of the plate to a very great extent, but in very hot weather these plates will not keep above 12 or 14 hours : the next operation is

FIXING.

Either a weak solution of cyanide of potassium, or hyposulphite of soda may be used, it is quite immaterial which, taking care to wash the residue well out of the film before drying it.

TRANSPARENT POSITIVES

ON PLAIN OR OPAL GLASS.

At page 49, directions are given for printing positive copies on glass plates by the albumenized collodion process, that being the usual means adopted for the transparent stereoscopic sliders, but since opal glass has come into use for this purpose a different course of proceeding must be taken, and experience has shown that for pictures

which are intended to be used in the magic lantern, the aid of the copying camera is a very great acquisition; pictures produced by this means have a far greater clearness and transparency than the dry collodion positives. The apparatus required for the purpose will be a copying camera, which should be made with an expanding body at each end; the lens is placed in the middle compartment, and at one extremity of the camera the negative to be copied is fixed in such a manner that no light can reach the lens except that which has passed through the negative; and at the other end of the camera, the dark slide containing the prepared sensitive plate is placed: the light is to be admitted through the negative by inclining the camera towards the sky, or by reflected light from a common mirror.

The amateur in copying will find some slight difficulty in understanding the alterations in the focus of the lens, but this point will be much simplified, if he recollects that the closer the object to be copied is brought to the lens, the further off will the ground glass have to be taken, and consequently, the image will be on a larger scale.

If the desire is to produce the positive copy on the same scale as the original negative, the distance from the negative to the lens must be the same as from the lens to the sensitive plate.

The readiest method of proceeding is to fix the ne-

gative in its carrier at one extremity, and focus by the sliding body at the other end of the camera ; should the image on the ground glass be too small, place the negative, say half an inch or more nearer to the lens, again focus by the sliding body, and, if required, make a further alteration in the relative distance between the previous named points. The lens best adapted for copying, is the achromatic triplet, using such a stop between the lenses as will give a sharp image ; these stops are easily altered without unscrewing the lenses from their mountings by means of the shifting diaphragm, or in default of a lens of this form, use an ordinary portrait combination, previously placing a small stop between the two sets of achromatic lenses. Having arranged the camera, and obtained the proper focus, proceed to the manipulation, which is precisely similar to the usual *positive* collodion process, employing either plain plate glass or the opal glass ; if the intention is to take pictures suited for use in the magic lantern, employ plain plate glass, but if for the stereoscope, a very effective picture is produced by using opal glass.

The time of exposure will be somewhat longer than would be given with a lens of the same form, and using the same chemicals in ordinary photography, for the amount of light passing through the lens is considerably less than if the operator were working from the natural object.

When the collodion plate is removed from the dark slide, develope with

Proto-sulphate of iron.....	12 grains
Glacial acetic acid	30 drops
Alcohol	20 „
Water.....	1 ounce

Be sure not to carry the development too far, but as soon as the detail is brought out in the shadows, which is known by holding the plate up and looking through at the light ; it must be stopped by washing with water, fixing with the usual cyanide of potassium.

Magic lantern sliders are colored with vegetable colours ground on a slab of plate glass in mastic varnish diluted with spirits of turpentine ; mineral colors are not sufficiently transparent, the materials can be obtained from my establishment, 22, Skinner Street, London.

Where the picture is intended for use in the stereoscope, it may be taken on opal glass ; this is white sheet glass one surface of which has been coated or flashed with opal, and afterwards vitrified by heat ; these pictures present the remarkable appearance of being positives either by transmitted or reflected light—the results, where carefully done, are very beautiful and well worthy of attention.

The focussing and development are precisely the same as for transparent positives previously described, observing that the collodion is to be poured on the side

of the glass that has been flashed with opal, and that the picture will require darkening after it has been fixed, for the deposit of silver is too bright to make a contrast when viewed by reflected light ; therefore, after the picture is fixed, tone it with the alabastrine solution; directions are sent with the solution, but for this purpose after the fixing solution has been well washed off the plate, the alabastrine solution must be poured rapidly over the surface whilst still wet and the silver deposit is instantly deepened to a rich tone, the solution should then be immediately washed off and the plate dried and varnished.

In taking impressions by means of the copying camera, from transparent negatives, it is important that the negative should possess a full amount of detail, and not be very deep or intense; in fact, the best results are obtained from a negative but little deeper than a direct positive ; therefore, an over exposed negative that has been developed with citric acid is by far the best : one under exposed would be too violent in its contrasts and unsuitable for copying.

PREPARED SENSITIVE PLATES.

These are all prepared on the best Patent Plate Glass, by either the Collodio-Albumen, Oxymer, or Hill Norris process; they are ready for exposure in the Camera.

Per doz.	Oxymer.			Collodio-Albumen.			Hill Norris's Dry Plates.		
	£	s.	d.	£	s.	d.	£	s.	d.
4½ in by 3½ in	0	4	0	0	5	0	0	5	0
5 „ 4 „	0	5	0	0	6	3	0	6	8
6 „ 5 „	0	7	4	0	9	0	0	10	0
6½ „ 4¾ „	0	7	4	0	9	0	0	10	0
8 „ 6 „	0	12	6	0	15	0	0	16	0
8½ „ 6½ „	0	13	4	0	17	0	0	18	0
9 „ 7 „	0	17	0	1	1	0	1	1	0
10 „ 8 „	1	3	0	1	10	0	1	6	8
12 „ 10 „	1	13	6	2	2	0	2	0	0
Stereoscopic	0	5	6	0	7	0	0	8	9

PLATE BOXES FOR PREPARED PLATES,

In Tin, with double bodies, perfectly light tight, and free from vapour.

	£	s.	d.
4½ in by 3½ in to hold twelve plates ...	0	3	6
5 „ 4 „ „ „ ...	0	4	6
6¾ „ 3½ „ „ „ ...	0	4	6
6½ „ 4¾ „ „ „ ...	0	5	6
8½ „ 6½ „ to hold six plates ...	0	6	6
9 „ 7 „ „ „ ...	0	7	0
10 „ 8 „ „ „ ...	0	10	0
12 „ 10 „ „ „ ...	0	12	0

Other sizes made to order.

THE APPARATUS, CHEMICALS, ETC., REQUIRED, WILL BE FOUND IN THE GENERAL CATALOGUE OF PHOTOGRAPHIC APPARATUS.